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(71) Applicant: **KABUSHIKI KAISHA TOSHIBA**
Kawasaki-shi, Kanagawa-ken 210 (JP)

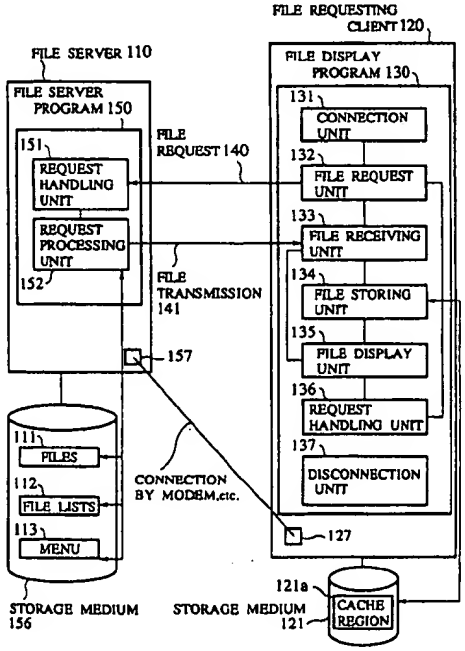
(72) Inventors:
- **Imai, Toru**
  Yokohama-shi, Kanagawa-ken (JP)
- **Fujii, Hiroko**
  Ohota-ku, Tokyo (JP)
- **Yoshida, Hideki**
  Yokohama-shi, Kanagawa-ken (JP)
- **Shimokawa, Toshihiko**
  Yokohama-shi, Kanagawa-ken (JP)

(74) Representative: **Zangs, Rainer E., Dipl.-Ing. et al**
Hoffmann, Eitle & Partner
Arabellastrasse 4/VIII
81925 München (DE)

(54) File transfer method, file requesting client device, and file server device

(57) A scheme for transferring files from a file server to a file requesting client, which enables request and transfer of files which are related to a user requested file at a time of transferring a user requested file. The file requesting client makes a file request indicating a desired file, and in response the file server transfers a file list of files related to the desired file indicated by the file request. Then, the file requesting client makes a transfer request requesting a transfer of files according to the file list, and in response the file server transfers the files requested by the transfer equest. Alternatively, the file requesting client makes a request indicating a desired file, and in response the file server transfers a concatenated file formed by concatenating files related to the desired file indicated by the request. Then, the file requesting client extracts individual files from the concatenated file.

FIG.1



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Description

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a file transfer method, a file requesting client device, and a file server device in a system for transferring files from a file server to a file requesting client.

Description of the Background Art

In recent years, a system for providing a service of electronic information such as electronic newspapers and electronic publications by utilizing the WWW (World Wide Web) has been widely used. The WWW is a system which provides various files through a network from a WWW server to a WWW viewer which is a client. In the WWW, it is possible to handle files in a format called HTML (HyperText Markup Language), where it is possible to set up a hyperlink from one HTML file to another file. The message exchanges between the server and the client are carried out according to the HTTP (HyperText Transfer Protocol). By utilizing the WWW, files on the WWW servers around the world can be referred from the WWW viewer. In the recent electronic information service, there is an attempt to provide information by charging fee using this WWW.

Here, the file is used as a generic term for all the information which is formed by media such as text, figures, static images, video, audio, etc., and which can be electronically provided. One file may be formed by multiple media.

On the other hand, there is a trend among users to utilize computers in compact sizes. In addition to desktop computers, computers in portable sizes such as laptop computers, notebook computers, PDA (Personal Digital Assistance), etc. are frequently utilized. Unlike the usual desk top computer, the portable terminal is not necessarily used in a state of being connected to a network all the times, and is rather frequently used by being connected to a network according to the need.

In a case of obtaining information by utilizing the WWW from such a computer, it is necessary to keep the portable terminal in a state of being connected to a network until the utilization of the WWW is finished. However, in a case where the portable terminal is connected to a network via a modem, for example, it is desirable to download as much information as possible into the portable terminal first and to view the information content later on after the connection is disconnected.

Also, in future, it is expected that an information server will be placed on a street corner so as to realize a situation in which many people can utilize it to download desired files at desired times into the portable terminal owned by each user for some charge or for free. In such a situation, it is also necessary to make it possible to download the necessary files first, and to view the files later on at places distanced from the information server.

Consequently, for the portable terminal in particular, at a time of obtaining a desired document by connecting the terminal to the network, it is necessary to provide a function which enables references to files similarly as in a case of accessing to the WWW server even in a state where the terminal is disconnected from a network, by downloading not just the desired file but also those files which are likely to be necessary later on into the terminal in advance. This is also an effective scheme for the desk top computer as well, because by downloading files in advance, it becomes possible to display files immediately when a user needs the files.

To this end, it is possible to consider a scheme in which a user explicitly requests necessary files to the server at a time of connecting a computer to a network and downloading a certain file from the server, whenever it is possible to specify the other files which are likely to be necessary later on.

However, when there are many necessary files, it would be necessary for a user to carry out tedious processing. For instance, in a case of electronic newspapers, it is not rare for the newspaper of each day to comprise over one hundred files, and in such a case, it would be necessary for a user to make accesses over one hundred times in order to download all these files.

Thus, in a conventional system for transferring files between the file server and the file requesting client, at a time of downloading a desired file, it has been difficult for the file requesting client or a user using the file requesting client to conveniently specify files related to that desired file which are also to be downloaded.

To sum up the above, in the WWW, a transfer of files from a server to a client is basically carried out file by file. Namely, when a user requests a display of a file such as a document, the WWW client communicates with the WWW server to carry out a transfer of the requested file, and displays the transferred file on a screen. In a case of displaying another file, the same operation is to be repeated again.

However, in a case where the client computer is a computer such as a portable terminal which is not necessarily used under an environment in which it is always possible to connect the terminal to a network, the above scheme is insufficient. In order to provide necessary files to a user immediately in response to a request from a user, it is necessary to transfer multiple files collectively from the server to the client while the client computer is connected with the network, and store the transferred files at the client side.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a file transfer method, a file server device, and a file requesting client device in a system for transferring files from a file server to a file requesting client, for enabling request and transfer of files which are related to a

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user requested file at a time of transferring a user requested file.

It is another object of the present invention to provide a file transfer methods, a file server device, and a file requesting client device, capable of efficiently limiting a number of transferred files when a file transfer is not fast enough, or when an available storage medium capacity provided in a client is insufficient, or else when a file display and execution capability of a client is limited, in which already transferred filed can be utilized at a client side even when a file transfer is interrupted in order to limit a number of transferred files.

According to one aspect of the present invention there is provided a method for transferring files from a file server to a file requesting client, comprising the steps of: (a) making a file request indicating a desired file, from the file requesting clients to the file server; (b) transferring a file list of files related to the desired file indicated by the file request, from the file server to the file requesting client; (c) making a transfer request requesting a transfer of files according to the file list, from the file requesting client to the file server; and (d) transferring the files requested by the transfer request, from the file server to the file requesting client.

According to another aspect of the present invention there is provided a file server device for providing files according to requests from a client, comprising: a storage medium for storing files that can be provided by the file server device and a file list of files related to each stored file; receiving means for receiving a file request indicating a desired file and a transfer request requesting a transfer of files from the client; and transmitting means for transmitting to the client the file list corresponding to the desired file indicated by the file request when the receiving means receives the file request, and the files requested by the transfer request when the receiving means receives the transfer request.

According to another aspect of the present invention there is provided a file requesting client device for receiving files provided by a file server, comprising: file request means for making a file request indicating a desired file, to the file server; receiving means for receiving an information transmitted from the file server in response to the file request; and transfer request means for making a transfer request for requesting a transfer of files according to a file list of files related to the desired file indicated by the file request, to the file server, when the information received by the receiving means is the file list.

According to another aspect of the present invention there is provided an article of manufacture, comprising: a computer usable medium having computer readable program code means embodied therein for causing a computer to function as a file server for providing files according to requests from a client, the computer readable program code means including: first computer readable program code means for causing said computer to receive a file request indicating a desired file and a transfer request requesting a transfer of files from the client; and second computer readable program code means for causing said computer to transmit to the client a file list of files related to the desired file indicated by the file request when the first computer readable program code means receives the file request, and the files requested by the transfer request when the first computer readable program code means receives the transfer request.

According to another aspect of the present invention there is provided an article of manufacture, comprising: a computer usable medium having computer readable program code means embodied therein for causing a computer to function as a file requesting client for receiving files provided by a file server, the computer readable program code means including: first computer readable program code means for causing said computer to make a file request indicating a desired file, to the file server; second computer readable program code means for causing said computer to receive an information transmitted from the file server in response to the file request; and third computer readable program code means for causing said computer to make a transfer request for requesting a transfer of files according to a file list of files related to the desired file indicated by the file request, to the file server, when the information received by the second computer readable program code means is the file list.

According to another aspect of the present invention there is provided a method for transferring files from a file server to a file requesting client, comprising the steps of: (a) making a request indicating a desired file, from the file requesting client to the file server; (b) transferring a concatenated file formed by concatenating files related to the desired file indicated by the request, from the file server to the file requesting client; and (c) extracting individual files from the concatenated file at the file requesting client.

According to another aspect of the present invention there is provided a file server device for providing files according to requests from a client, comprising: a storage medium for storing files that can be provided by the file server device, and a concatenated file formed by concatenating files related to each stored file; receiving means for receiving a request indicating a desired file from the client; and transmitting means for transmitting to the client the concatenated file corresponding to the desired file indicated by the request and a program for extracting individual files from the concatenated file.

According to another aspect of the present invention there is provided a file requesting client device for receiving files provided by a file server, comprising: request means for making a request indicating a desired file to the file server; receiving means for receiving an information transmitted from the file server in response to the file request; and extracting means for extracting individual files from a concatenated file formed by concatenating files related to the desired file indicated by the request, when the information received by the receiving means is the concatenated file.

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According to another aspect of the present invention there is provided an article of manufacture, comprising: a computer usable medium having computer readable program code means embodied therein for causing a computer to function as a file server for providing files according to requests from a client, the computer readable program code means including: first computer readable program code means for causing said computer to receive a request indicating a desired file from the client; and second computer readable program code means for causing said computer to transmit to the client a concatenated file formed by concatenating files related to the desired file indicated by the request and a program for extracting individual files from the concatenated file.

According to another aspect of the present invention there is provided an article of manufacture, comprising: a computer usable medium having computer readable program code means embodied therein for causing a computer to function as a file requesting client for receiving files provided by a file server, the computer readable program code means including: first computer readable program code means for causing said computer to make a request indicating a desired file to the file server; second computer readable program code means for causing said computer to receive an information transmitted from the file server in response to the file request; and third computer readable program code means for causing said computer to extract individual files from a concatenated file formed by concatenating files related to the desired file indicated by the request, when the information received by the second computer readable program code means is the concatenated file.

Other features and advantages of the present invention will become apparent from the following description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of an information communication system for realizing the file transfer method according to the present invention.

Fig. 2 is a sequence chart for an exemplary file transfer procedure in the first embodiment of the present invention.

Fig. 3 is an illustration of an exemplary description of a menu that can be used in the first embodiment of the present invention.

Fig. 4 is an illustration of one example of a file list that can be used in the first embodiment of the present invention.

Fig. 5 is an illustration of another example of a file list that can be used in the first embodiment of the present invention.

Fig. 6 is a block diagram of an exemplary viewer program that can be used in the first embodiment of the present invention.

Fig. 7 is a flow chart for an exemplary processing by the viewer program of Fig. 6 in the first embodiment of the present invention.

Fig. 8 is an illustration of another exemplary description of a menu that can be used in the first embodiment of the present invention.

Fig. 9 is an illustration of an exemplary HTML file containing an applet that can be used in the first embodiment of the present invention.

Fig. 10 is a sequence chart for another exemplary file transfer procedure in the first embodiment of the present invention.

Fig. 11 is a flow chart for an exemplary processing by an applet in the first embodiment of the present invention.

Fig. 12 is an illustration of an exemplary viewer screen in the first embodiment of the present invention.

Fig. 13 is a sequence chart for still another exemplary file transfer procedure in the first embodiment of the present invention.

Fig. 14 is a sequence chart for an exemplary file transfer procedure in the second embodiment of the present invention.

Fig. 15 is an illustration of an exemplary description of a menu that can be used in the second embodiment of the present invention.

Fig. 16 is an illustration of an example of a requested file that can be used in the second embodiment of the present invention.

Fig. 17 is a sequence chart for another exemplary file transfer procedure in the second embodiment of the present invention.

Fig. 18 is an illustration of another exemplary description of a menu that can be used in the second embodiment of the present invention.

Fig. 19 is an illustration of an exemplary HTML file containing an applet that can be used in the second embodiment of the present invention.

Fig. 20 is an illustration of still another exemplary description of a menu that can be used in the second embodiment of the present invention.

Fig. 21 is a block diagram of an exemplary viewer program that can be used in the second embodiment of the present invention.

Fig. 22 is a block diagram of an exemplary WWW server program that can be used in the first and second embodiments of the present invention.

Fig. 23 is a block diagram of an information communication system for realizing the file transfer method according to the third embodiment of the present invention.

Fig. 24 is a flow chart for the first concrete example of an operation procedure for a file display program in the third embodiment of the present invention.

Fig. 25 is an illustration of an example of a file list that can be used in the third embodiment of the present invention.

Fig. 26 is a flow chart for the second concrete example of an operation procedure for a file display program in the third embodiment of the present invention.

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